Chapter 5

Chapter Test

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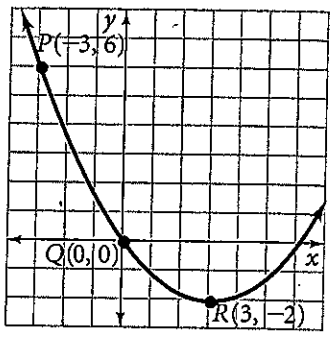
1. Write the equation of the parabola in standard form. Find the coordinates of the points corresponding to P, Q, and R.



Sketch a graph of the parabola with the given vertex through the given point.

2. vertex $(0, 0)$, point $(-3, 3)$
3. vertex $(1, 5)$, point $(2, 11)$

Graph each quadratic function. Identify the axis of symmetry and the coordinates of the vertex.

4. $y = x^2 - 7$
5. $y = x^2 + 2x + 6$
6. $y = -x^2 + 5x - 3$
7. $y = -\frac{1}{2}x^2 - 8$

Simplify each expression.

8. $\sqrt{-16}$
9. $4\sqrt{-9} - 2$
10. $(4 - i) + (5 - 9i)$
11. $(2 + 3i)(8 - 5i)$
12. $(-3 + 2i) - (6 + i)$
13. $(7 - 4i)(10 - 2i)$

14. **Physics** For a model rocket, the altitude h, in meters, as a function of time t, in seconds, is given by $h = 68t - 4.9t^2$. Find the maximum height of the rocket. How long does it take to reach the maximum height?

Find the additive inverse of each number.

15. $3 - 7i$
16. $-2 + i$

Graph each number on the complex plane. Then find its absolute value.

17. $7 - 2i$
18. $8i$
19. $4 + 8i$
20. 5
21. $6 - 4i$
22. $-2 + 3i$

23. **Writing** Compare graphing a number on the complex plane to graphing a point on the coordinate plane. How are they similar? How are they different?

Solve each quadratic equation.

24. $x^2 - 25 = 0$
25. $x^2 + 5x - 24 = 0$
26. $x^2 + 8x - 9 = 0$
27. $3x^2 - 21x + 3 = 0$
28. $6x^2 = 9x$
29. $4x^2 + 4x + 4 = 0$
30. $5x^2 + x + 2 = 0$
31. $-3x^2 - 2x + 7 = 0$
32. $2x^2 + 6x + 12 = 0$

Write each function in vertex form. Sketch the graph of the function and label its vertex.

33. $y = x^2 - 6x + 5$
34. $y = -x^2 + 8x - 10$
35. $y = 2x^2 - 3x - 1$
36. $y = -\frac{1}{2}x^2 + 4x - 9$

Evaluate the discriminant of each equation. How many real and imaginary solutions does each have?

37. $x^2 + 6x - 7 = 0$
38. $3x^2 - x + 3 = 0$
39. $-2x^2 - 4x + 1 = 0$
40. $-x^2 + 6x - 9 = 0$

41. **Open-Ended** Sketch the graph of a quadratic function $f(x) = ax^2 + bx + c$ whose related quadratic equation $ax^2 + bx + c = 0$ has no real solutions.